REMARKS

I. STATUS OF THE CLAIMS

Claims 1, 2, 4, 5, 22, 23, 25, 26, and 28-35 are pending.

Claims 22, 23, 25, and 26 are cancelled as of this Response.

Claim 28 is amended to incorporate a limitation that the catalyst system is a homogenous liquid. All of the independent claims now include this limitation.

II. CLAIM REJECTIONS UNDER 35 U.S.C. §112

Current Claims 28-33 and 35 stand rejected under 35 U.S.C. §112 on the basis that the specification fails to support a limitation that the reactor is a loop reactor.

The Examiner continues to cite as insufficient support the specification at page 18, lines 7-8, which indicates that a continuous feed reaction is used. The Examiner notes that the term "loop" is not used.

In the previous response dated December 15, 2004, the applicants cited additional support at page 15 of the specification at lines 1-4:

> Reaction products, i.e., olefin trimers as disclosed in this specification, can be prepared with the disclosed catalyst systems by solution reaction, slurry reaction, and/or gas phase reaction techniques using conventional equipment and contacting processes.

While the Examiner has not addressed this additional support directly, the rejections of Claims 28-33 and 35 under 35 U.S.C. §112 are nevertheless maintained.

The applicants again submit that anyone of ordinary skill in the art would readily understand such description to include reference to loop reactors, which are an extremely common configuration of such reactors in industry. The applicants would further point out that it is well known in the chemical industry that the assignee's own practice of this technology uses loop reactors exclusively.

The applicants therefore request that this rejection be withdrawn.

III. CLAIM REJECTIONS UNDER 35 U.S.C. §102

The Examiner continues to reject Claims 28, 29, 31 and 34 under 35 U.S.C. §102(b) on the basis that Avidan (U.S. Patent No. 4,778,661) discloses a "loop/continuous" reactor, in particular through elements 10, 12, 13, 14 and 16. See Office Action at paragraph 4.

Applicants continue to urge that Avidan does not disclose a loop reactor, and that one of ordinary skill in the art would readily understand that loop reactors are not synonymous with continuous reactors, as the Examiner suggests. Regarding the Examiner's assertion that a loop reactor is shown by elements 10, 12, 13, 14, and 16 in Figure 1 of Avidan, applicants note that Figure 1 is unambiguously labeled as a fluidized bed reactor (See col. 3, line 14). Applicants urge that one of ordinary skill in the art would readily understand that a fluidized bed reactor is structurally and functionally different from a loop reactor.

In a loop reactor, the reactants **and** catalyst are iteratively circulated through a loop while feedstocks are continuously added and reaction products are continuously withdrawn from the circulated mixture. The elements referred to in Figure 1 do not disclose or suggest a loop reactor configuration, instead they merely describe the regeneration of spent catalyst (See col. 6, lines 23-58). The applicants further note that the catalyst system described in Avidan is heterogenous (See col. 3, lines 26-41), and is not withdrawn with the reaction product as in a loop reactor. In all of the instant claims, the reactor is a loop reactor, the catalyst is a homogenous liquid, a portion of the catalyst is continuously withdrawn with the reaction products, and there is no catalyst regeneration. These aspects are quite different from the system described in Avidan. The applicants therefore request that the rejection of Claims 28, 29, 31 and 34 be withdrawn.

Applicants also note that Claim 28 and its dependent Claims 29 and 31 also include the limitation at the end of part d) of Claim 28 specifying that the separation of catalyst from the olefin reactant and the trimerization reaction products occurs after discharge from said reactor into said reactor effluent line. In support of the rejection of these claims, the Examiner asserts that this aspect is shown in Avidan as element 50 of Figure 1. In response, applicants note that element 50 does not serve the function of separating catalyst from the reactor effluent. As discussed above, the catalyst in Avidan is a solid, heterogenous catalyst. The only portion of the reactor effluent shown separated and recycled by element 50 in Figure 1 is the gas portion of the

reactor (labeled C4 offgas), not the catalyst. Applicants note that this makes sense because what Avidan is disclosing is a fluidized bed reactor using a heterogenous catalyst, such that, unlike the present invention, in Avidan none of the catalyst would be found at the top of the reactor or in the reactor effluent at element 50. Applicants therefore submit that the rejection of Claims 28, 29 and 31 should also be withdrawn on this basis.

IV. CLAIM REJECTIONS UNDER 35 U.S.C. §103

A. Rejections of Claims 1, 2, 4 and 35 Based On Avidan Combined With Lashier, Mehra and Reagen

The Examiner rejects claims 1, 2, 4 and 35 under 35 U.S.C. §103 based on Avidan combined with Lashier (U.S. Patent No. 5,689,028), Mehra (U.S. Patent No. 5,521,264) and Reagen (U.S. Patent No. 5,376,612). See Office Action at paragraph 7.

Claim 35 includes the limitation that the reactor must be a loop reactor. As set forth above, applicants urge that Avidan does not disclose a loop reactor. Since none of the cited references disclose this aspect of Claim 35 or suggest a motivation under which they could be modified to include this aspect, applicants respectfully request that this rejection against Claim 35 be withdrawn.

Claims 1, 2 and 4 each include the limitation that the inlet line from the source of catalyst system further comprises a reactor inlet operably connected from a source of trimerization reaction solvent. Applicants note that this limitation is important in some embodiments because the catalyst flow rate through the reactor can be small enough that pre-dilution with reaction solvent is desirable to control the residence time of the catalyst in the reactor.

The Examiner asserts that this aspect of Claims 1, 2 and 4 is disclosed in Mehra, pointing to col. 13, lines 61-65 of Mehra for the proposition that Mehra "teaches the use of a solvent to absorb ethylene, higher alpha olefin comonomers, and heavier hydrocarbons." The applicants urge that this has nothing to do with the limitation in question, that is, the dilution of an inlet catalyst stream. Mehra simply does not discuss this consideration. Furthermore, the applicants note that Mehra is directed to heterogenous catalysts in fluidized bed reactors for gas phase

reactions. No one of skill in the art would have turned to these references for the subject matter of Claims 1, 2 and 4.

In the most recent Office Action, the Examiner asserts that it is an inherent feature of the cited teachings of Mehra to have an inlet line from a source of catalyst system comprising a reactor inlet operably connected from a source of trimerization reaction solvent, as specified in claims 1, 2, and 4. See Office Action at page 13. In response, applicants quote the cited portion of Mehra below to show that this is not the case:

> An absorption solvent stream 98 is pumped into the top of the absorber stripper and flows down the absorption section 94 countercurrently contacting the rising gas stream, absorbing ethylene, higher alpha olefin comonomers, and heavier hydrocarbons out of the reactor vent gas stream.
>
> Mehra at col.13, lines 61-65.

The cited portion of Mehra simply does not relate to catalyst dilution, and in particular it does not relate to dilution of a liquid homogenous catalyst in a liquid phase reaction system. Applicants also note that the technology Mehra is discussing is **gas phase** olefin polymreization with **heterogeneous catalysts**. See Mehra at col. 3, lines 65-66; col.5, line 63 to col. 6, line 68. In contrast, the present invention relates to **liquid phase** olefin trimerization with **homogenous catalysts**.

Applicants therefore respectfully request that this rejection against Claims 1, 2 and 4 be withdrawn.

B. Rejection of Claim 30 Based On Avidan Combined With Lashier

The Examiner rejects Claim 30 under 35 U.S.C. §103 based on Avidan combined with Lashier. See Office Action at paragraph 8.

Claim 30 depends from Claim 28, and further includes the limitation of having a catalyst system deactivator inlet line operably connected into the reactor effluent line. Applicants note that Claim 28 is currently rejected only under 35 U.S.C. §102 in view of Avidan. In response to that rejection, applicants pointed to various aspects of Claim 28 that are not disclosed in Avidan, namely that a loop reactor is used, that the catalyst is a homogenous liquid, and that the

separation of catalyst from the olefin reactant and the trimerization reaction products occurs after discharge from said reactor into said reactor effluent line. Since these aspects of Claim 30 are also not present in the combined teachings of Avidan and Lashier, applicants respectfully request that this rejection of Claim 30 be withdrawn.

C. Rejection of Claims 5 and 32 Based On Avidan Combined With Harandi

The Examiner rejects Claims 5 and 32 under 35 U.S.C. §103 based on Avidan combined with Harandi (U.S. Patent No. 4,788,366). In the case of Claim 5, the Examiner additionally combines the Lashier, Mehra and Reagen references that formed the basis for also rejecting Claim 1, from which Claim 5 depends. See Office Action at paragraphs 9 and 11. In each case, the basis for the Examiner's support is provided in Harandi at col. 3, lines 41-52 for asserting that these limitations are taught in the prior art.

Claims 5 and 32 each provide the limitation that an inlet line is operably connected into said reactor effluent line from a source of heavies.

In response to this rejection, applicants note that neither Harandi nor Avidan disclose the introduction of a heavies stream into a reactor effluent stream. The Examiner seems to suggest in paragraph 9 that the references teach the introduction of a heavies stream into the reactor itself. While applicants also disagree with that characterization, they note that the limitation in question relates to introduction of a heavies stream to the reactor effluent, not the reactor itself. Therefore the Examiner has not shown the presence or suggestion of this limitation in the combined teachings of Avidan and Harandi.

However, in either case, the passage in Haradi cited by the Examiner simply states that a heavies stream can be produced in a fluidized catalytic cracking unit. Figure 1 of Harandi shows that what is meant by heavy fraction is a composition comprising greater than C20's (fractions of C20 and smaller are removed separately as lighter fractions). Avidan does not disclose that such a stream can be used in a trimerization system, and also makes no suggestion of a need to add a heavies stream to the reactor effluent. The Examiner has not pointed to such a teaching in Avidan or elsewhere. The desired feedstocks of Avidan comprise C4-C6 alkenes (col. 5, line 5).

The present application discusses that in some embodiments, it may be desirable to supply the reactor effluent stream with a source of heavies in order to maintain flowability:

> Referring now to FIGURE 6, another embodiment of the invention, wherein like numbers represent like components and wherein a catalyst system and heavies effluent line can be fed to separator 41 to separate trimerization reaction co-products, such as decenes via effluent line 42 from other reactor effluent components via effluent line 43, such as, for example catalyst system, polymer particulates, other higher olefinic co-products, including some decenes. It should be noted that some of the decenes must be kept in effluent line 43 in order to maintain flowability of catalyst system effluent and/or discharge products and possible polymer particulates, if not removed previously in filter 7. Decenes removed via effluent line 42 can be recovered or routed for additional use, such as hydrogenation to commercially useful products such as Soltrol® 100.
>
> Application at page 15.

The cited references do not discuss this consideration or otherwise teach or suggest this aspect of applicants' design. As previously discussed, Avidan relates to heterogeneous catalysts that would not be present in the reactor effluent, such that this consideration would not be a concern. By contrast, in the present application, the homogenous liquid catalyst is included in the reactor effluent, such that flowability of that stream can be a concern. Applicants therefore respectfully request that this rejection against Claims 5 and 32 be withdrawn.

Specifically regarding Claim 5, applicants also note that this claim depends from Claim 1. Applicants have separately argued the patentability of Claim 1, and therefore as an alternate basis to the particular language of Claim 5, applicants assert that Claim 5 should also be patentable since it depends from Claim 1.

Likewise, specifically regarding Claim 32, applicants also note that this claim depends from Claim 28. Applicants have separately argued the patentability of Claim 28, and therefore as an alternate basis to the particular language of Claim 32, applicants assert that Claim 32 should also be patentable since it depends from Claim 28.

D. Rejection of Claim 33 Based On Avidan Combined With Mehra

The Examiner rejects Claim 33 under 35 U.S.C. §103 based on Avidan combined with Mehra. See Office Action at paragraph 12.

Like Claims 1, 2 and 4 discussed above, Claim 33 includes the limitation that the inlet line from the source of catalyst system further comprises a reactor inlet operably connected from a source of trimerization reaction solvent. Applicants note that this limitation is important in some embodiments because the catalyst flow rate through the reactor can be small enough that pre-dilution with reaction solvent is desirable to control the residence time of the catalyst in the reactor.

The Examiner asserts that this aspect of Claim 33 is disclosed in Mehra, pointing to col. 13, lines 61-65 of Mehra for the proposition that Mehra "teaches the use of a solvent to absorb ethylene, higher alpha olefin comonomers, and heavier hydrocarbons." As stated above with respect to Claims 1, 2 and 4, the applicants urge that this has nothing to do with the limitation in question, that is, the dilution of an inlet catalyst stream. Mehra simply does not discuss this consideration. Furthermore, the applicants note that Mehra is directed to heterogenous catalysts in fluidized bed reactors for gas phase reactions. No one of skill in the art would have turned to these references for the subject matter of Claim 33. Applicants therefore respectfully request that this rejection be withdrawn.

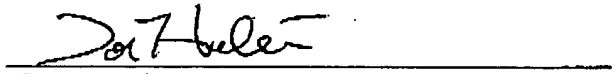
Further, applicants note that Claim 33 depends from Claim 28. Applicants have separately argued the patentability of Claim 28, and therefore as an alternate basis to the particular language of Claim 33, applicants assert that Claim 33 should also be patentable since it depends from Claim 28.

V. CONCLUSION

Applicants submit that the amendments and remarks presented herein are sufficient to address all of the prior art concerns previously raised by the Examiner in past Office Actions. The applicants therefore respectfully request that the amendments be entered, and that an Office Action be issued in their regard, allowing all of the presented claims, or otherwise any portion thereof as considered appropriate by the Examiner.

The applicants would welcome any discussion if the Examiner has any questions or continuing concerns. The Examiner is therefore invited to call the undersigned at (832) 813-4661 if this might be helpful.

Respectfully submitted,



Joe D. Hulett
Reg. No. 42,675

Date: 7-5-05

Chevron Phillips Chemical Company
10001 Six Pines Drive
The Woodlands, TX 77380
Direct 832-813-4661
Fax 832-813-1804
Email: huletjd@cpchem.com

Our Docket No.: 33470 US1